19990923.ba v02_n676.bam.990923 v02_n677.bam.990923

>From ???@??? Thu Sep 23 17:11:10 1999
Message-Id: <199909230620.d8N6K9112874@sco.theporch.com>
Date: Thu, 23 Sep 1999 01:19:34 CDT
From: Old Tube Radios <boatanchors@theporch.com>
To: Old Tube Radios <boatanchors@theporch.com>
Subject: BOATANCHORS digest 2676

BOATANCHORS Digest 2676

Topics covered in this issue include:

1)
by "Barry L. Ornitz" <ornitz@tricon.net>
2) FS: Amphenol Tiwn-ax connectors
by Tom Smith <tsmith@hal-pc.org>
3) Drake T4X-C audio
by Bill Wilson <w4biz@mindspring.com>
4) BIG IRON, transformers and chokes and rectifiers
by "Barry L. Ornitz" <ornitz@tricon.net>
5) Re: GB> Coil Winding Machine--date
by "Sandy W5TVW" <ebjr@i-55.com>
6) : Drake T4X-C audio
by "Barry L. Ornitz" <ornitz@tricon.net>
7) Re: BAers at EXPO
by George Sieverson <k9gdt@starnetusa.net>
8) RE: "Wobbler virus....
by "Sandy W5TVW" <ebjr@i-55.com>
9) Re: BIG IRON, transformers and chokes and rectifiers
by "Arden Allen" <gumbear@pacbell.net>
10) Re: GB> Coil Winding Machine--date
by "Arden Allen" <gumbear@pacbell.net>
11) HRO-500 help needed
by JPevner@aol.com
12) Re: BAers at EXPO
by Mike Souhrada <wb9iog@revealed.net>
13) Re: BIG IRON, transformers and chokes and rectifiers
by "Barry L. Ornitz" <ornitz@tricon.net>
14) Re: GB> Coil Winding Machine
by "Barry L. Ornitz" <ornitz@tricon.net>

Message-Id: <199909230029.UAA31066@flash.naxs.net>
From: "Barry L. Ornitz" <ornitz@tricon.net>
To: Old Tube Radios <boatanchors@theporch.com>
Cc: "Sandy Blaise W5TVW" <ebjr@worldnet.att.net>,
"Andy Wallace" <wallace@world.std.com>

Subject:
Date: Wed, 22 Sep 1999 21:21:31 -0400

Sorry to have to quote so much...

Sandy Blaise, W5TVW, wrote:

>> "Q will depend on the "form factor" of the windings,
>> wire size used, distributed capacity, number of 'pies' etc., etc.

And Arden Allen, KB4NAX, replied:

>WRONG. Better get out that yellowed old theory book. Q is not a function
>of magic, it is a function of electrical energy converted into heat
energy.
>Burn some lamp oil.

Well, that goes for you too Arden. While Sandy was incorrect about the need for high-Q in an RF choke, his statement above is quite correct. Coil Q is certainly not a function of magic, but every item mentioned above affects coil Q with the theoretical exception of distributed capacity. But since ALL real wire insulation has dielectric loss, distributed capacity decreases a coil's Q.

An RF choke requires a high impedance at all frequencies of interest. This typically means inductance because resonance in a choke can cause high circulating currents leading to choke failure.

73, Barry   WA4VZQ   ornitz@tricon.net

Message-ID: <37E938B0.70FD1393@hal-pc.org>
Date: Wed, 22 Sep 1999 20:14:40 +0000
From: Tom Smith <tsmith@hal-pc.org>
MIME-Version: 1.0
To: Old Tube Radios <boatanchors@theporch.com>
Subject: FS: Amphenol Tiwn-ax connectors
Content-Type: text/plain; charset=us-ascii
Content-Transfer-Encoding: 7bit

I have a small supply of Amphenol Twin-ax connectors new in the plastic wrappers available for $4 each plus shipping. These are used for the balanced input for the R-390 / R389 receivers. If you need or anticipate the need for some of these, drop me a line.

Thanks! Tom N5AMA

Message-ID: <37E98360.78E5E259@mindspring.com>
Date: Wed, 22 Sep 1999 20:33:20 -0500
From: Bill Wilson <w4biz@mindspring.com>
MIME-Version: 1.0
To: Old Tube Radios <boatanchors@theporch.com>
Subject: Drake T4X-C audio
Content-Type: text/plain; charset=us-ascii
Content-Transfer-Encoding: 7bit

I had to send the old IC-765 back to Icom for yet more PLL work. Pulled out the trusty old Drake C line for my casual SSB stuff. On 160 meters I got "thin audio" reports and "nasal clamping" audio reports. Any tips on audio on the Drake transmitters? I'm using a Shure 444D mic which might be part of the problem?

Much thanks in advance!

Bill
W4BIZ
Jacksonville, Al.

Message-Id: <199909230038.UAA00220@flash.naxs.net>
From: "Barry L. Ornitz" <ornitz@tricon.net>
To: Old Tube Radios <boatanchors@theporch.com>
Cc: "Richard Post" <postr@ohiou.edu>,
   "John Sehring" <JOHN_SEHRING.parti@ecunet.org>,
   "Arden Allen" <gumbear@pacbell.net>, "Sam McIntosh" <mcintosa@basf.com>
Subject: BIG IRON, transformers and chokes and rectifiers
Date: Wed, 22 Sep 1999 21:33:28 -0400

Sam McIntosh's question about transformer ratings, followed by Arden Allen's comments on power supplies, then John Sehring's note on the same, and finally Richard Post's questions on chokes got me to digging a little on the subject. I hope the information in the following text will be worth keeping. It goes into estimating the ratings for unknown transformers.

For chokes, some other considerations are in order. Chokes typically have an air gap to reduce core saturation. Thus they should be operated at current levels where their inductance is still adequate for the filtering they perform. Higher currents lead to saturation and a decrease in inductance. Wire resistance is an issue too since with excessive resistance, the voltage drop may be high. Even if the voltage drop is tolerable, and the inductance is still adequate, the choke must also be able to dissipate the heat produced by core losses and its resistance.

As in transformers, limiting the temperature rise is a good way of preventing damage to chokes. The same as in transformers, a 40 C (72 F) temperature rise is the normal maximum. The old rule of thumb follows with chokes too. If you can safely hold your hand on the unit after several minutes of operation, the choke is not operating at too high a temperature. Again, watch out for high voltage.

Note the comments about replacing vacuum rectifiers with silicon diodes. A series resistor will likely be needed to maintain the older voltage levels. To quote from Arden's note:

> What determines both the resistance and wattage of a resistor in this application is the current pulse that flows during the part of the AC cycle that charges the power supply filter input capacitor. The applied voltage, the value of the resistor, the value of the input capacitor, the current being drawn by the power supply's load, all effect the duration and thus waveform of that current pulse. Determining the resistance and wattage value for the rectifier replacement resistance when installing solid state rectifiers does not lend itself easily to linear analysis (assuming I would know how to proceed with such a thing). Cut-and-try is the only practical way to determine resistance.

I fully agree with all of this except the last sentence. With vacuum rectifiers, the internal plate resistance of the tube is inversely proportional to the cube root of the tube current. Thus there can be no single resistor value that can be added in series with a silicon diode that will behave identically to the way the tube behaves over a wide current range. However, once the desired average current is known, it is possible to calculate the resistor value fairly accurately. The method is based on a non-linear analysis, and while first published 56 years ago, it is still in common use. Simplified versions of this method have been published in many places including the ARRL Handbooks, but these leave out one important graph needed for vacuum tube rectifiers. The original article is best consulted as it has experimental data for 34 popular vacuum rectifier tubes (like 5U4, 5R4, 5Y3, 80, 6X4, etc.). While the calculations are not trivial, they can be done quickly - probably faster than Arden can solder in a few resistors. For those than can get the original 20 page article, I suggest they do so as the analysis given is an excellent introduction to power supply design. See:

Schade, O. H.: "Analysis of Rectifier Operation",
Proc.I.R.E., Vol. 31, pp. 341-361, July, 1943.

One final note before the article on transformer sizing...

The use of 60 C (140 F) as a maximum surface temperature for equipment has a good foundation in safety. This is generally considered the highest temperature that a person can force himself to voluntarily touch. It is also a few degrees below the temperature where skin burns occur. So if you can hold your hand on a component, you are safe about the temperature not causing burns. Just remember to touch things safely. First make sure you do not touch anything that can provide an electrical shock, and then touch carefully (and quickly) in case the surface IS above 60 C.

Play it safe! Would you want other members of this list over to console your widow(er) and prize Boatanchor collection? :-)

73, Barry L. Ornitz WA4VZQ ornitz@tricon.net

~~~~~~

Transformer Ratings

Copyright 1999 B. L. Ornitz

A number of methods of "guestimating" transformer ratings have been published. Most methods do quite well for large transformers, but fail to give reasonable numbers for small transformers. This is because small transformers have a much greater core loss than do large transformers. Small transformers are better able to dissipate heat than are large transformers, so they are often designed with higher flux densities (and higher core losses) - in an effort to save weight and cost. Also, in small transformers, wire gauge cannot be used to estimate the ratings as values from 200 to 1500 circular mils per amp ratings are in use.

For large transformers in commercial service, a 40 C temperature rise is the norm (40 C or 72 F temperature rise over room temperature). It is best to keep transformer temperatures low - 90 C or 194 F should be an absolute maximum unless you know the transformer has insulating materials that can withstand higher temperatures. [But if you know this for sure, why are you bothering to estimate the ratings?] Experimental evidence has shown that transformers generally deteriorate twice as fast for every 8 C (12 F) rise in temperature. So keep the transformer as cool as possible (a reason why I always use solid state rectifiers instead of tubes, reducing the transformer load by eliminating the rectifier filament power). A good rule of thumb is to operate the transformer for several minutes at the
~~~~~~

expected load. If you can hold your hand on it without it being too hot to touch (about 60 C or 140 F), the transformer is adequate for that load. Watch out for high voltage, however.

For amateur use, a typical transformer can be used to supply higher levels of power than in commercial service because of the intermittent current demand. In powering single sideband transmitters, even higher power levels can be obtained; while the peak power may be high, the average power may be quite low. With the above information in mind, the following equations should make some sense. While we are talking power here, we should actually use volt-ampere units rather than watts since the transformer generates heat with both real and reactive power.

Commercial Service (also use for receivers):

Average Volt-Amperes = 1.4 * Transformer Volume (in cubic inches)

Average Volt-Amperes = 28 * Transformer Weight (pounds) - 100

Thus a 10 pound transformer would be rated for 180 volt-amperes. Such a transformer would be about 5 inches on a side. A potted military transformer might be somewhat larger and heavier than this for the same rating. The potting adds weight but only causes a slight improvement in cooling.

CW Service:

Average Volt-Amperes = 60 * Transformer Weight (pounds) - 250

SSB Service:

Average Volt-Amperes = 70 * Transformer Weight (pounds) - 250

So the same transformer as above would be rated for 350 V-A for CW and 450 V-A for SSB service, while only 180 V-A for continuous duty. It is easy to see why SSB allowed weight reduction in military gear.

For small transformers, as noted earlier, higher core losses can be tolerated. If you can measure the effective core area, a better estimate can be obtained. With typical E I laminated cores, measure the cross sectional area of the center of the "E". Then use the following equation. This is good for small transformers up to about 500 volt-amperes. Note the area is raised to the 1.5 power.

    Average Volt-Amperes = 40 * Area (sq.in.) ^ 1.5

Thus a transformer having laminations 1.75 inches thick with the width of the E being 1.5 inches would have an effective area of 2.625 square inches. This would give an estimate of 170 watts for this transformer.

The ultimate test of a transformer's ratings, as mentioned earlier, is determined by its temperature rise. If, after a while of operation, the transformer is not too hot to touch, you are operating it at a safe level. If you need just a little more power from the transformer, provide for better cooling. This may be nothing more than providing better ventilation around the transformer, or it may mean a small fan is needed. Very old transformers, with insulating materials not rated for today's standards, need to be run cooler than modern transformers. Reducing the load on old transformers can also prolong their life, so consider using solid-state rectification. If you decide to operate at a higher transformer temperature, do so with caution and knowledge that you are reducing its life.

It should be noted that the replacement of solid-state rectifiers for vacuum diodes will result in a higher voltage output from the power supply. Thus a resistor may be needed in series with the diode to maintain the same final voltage. This resistor will generate heat, of course. But it will generate no more heat than the original tube did. In fact, it will generate less heat as the filament power is not being used. Placement of this resistor may be important for adequate cooling so remember this when substituting silicon diodes for tube rectifiers. With typical rectifier tubes, the transformer will see from 10 to 15 watts less heat it has to dissipate when going to silicon diodes.

Message-ID: <004801bf0567$bc4879e0$1260e7d0@SandyBlaize>
From: "Sandy W5TVW" <ebjr@i-55.com>
To: Old Tube Radios <boatanchors@theporch.com>
Subject: Re: GB> Coil Winding Machine--date
Date: Wed, 22 Sep 1999 20:09:17 -0500

MIME-Version: 1.0
Content-Type: text/plain;
     charset="iso-8859-1"
Content-Transfer-Encoding: 7bit

>> "Q will depend on the "form factor" of the windings,
>> wire size used, distributed
>> capacity, number of 'pies' etc., etc.
>
>WRONG. Better get out that yellowed old theory book. Q is not a function
>of magic, it is a function of electical energy converted into heat energy.
>Burn some lamp oil.
>
>Arden Allen   KB6NAX   Vallejo, CA   gumbear@pacbell.net
>

I've wound an awful lot of coils thru the years
and they don't always behave like the math geniuses say they will!
Edwin Armstrong proved this over and over.....that the "experts"
weren't always right! "It's what we know, that ain't always so" was his
byword. I've seen things that flew right in the face of theorists and
stuff MSEE and PhDEE didn't have answers for.

Just the wire isn't the only factor that comes into play. If it
is then all the "Q" meters I've used are lying to me. Form factor
(length vs. diameter, core size, insulation, how the wire is
wound will have a lot to do with what you come out with in the end.

I'm not jumping on you Arden, it's just what I've observed over
many years. I have also seen EE's that were whizzes at theory
but couldn't build a decent crystal set. Some didn't know which
end of the soldering iron gets hot!

73,
Sandy

Message-Id: <199909230113.VAA08107@flash.naxs.net>
From: "Barry L. Ornitz" <ornitz@tricon.net>
To: Old Tube Radios <boatanchors@theporch.com>

Subject: : Drake T4X-C audio
Date: Wed, 22 Sep 1999 22:08:29 -0400

The microphone is likely not the problem unless you have it switched to low impedance output for the newer rig.

If the Drake has not been used in a while, look at the bypass electrolytic capacitors in the audio section. These can dry out and lose capacitance, causing the gain for low frequencies to drop.

73, Barry WA4VZQ ornitz@tricon.net

Message-ID: <37E99076.94B9A4B2@starnetusa.net>
Date: Wed, 22 Sep 1999 21:29:10 -0500
From: George Sieverson <k9gdt@starnetusa.net>
MIME-Version: 1.0
To: Old Tube Radios <boatanchors@theporch.com>
Subject: Re: BAers at EXPO
Content-Type: text/plain; charset=us-ascii
Content-Transfer-Encoding: 7bit

Greetings Red and Thermionic Emissives,

I'll be there both days with my hamfest buddy, K9KLT. While there, be sure to check out "Boatanchor Row" just south of the bleacher area.

If you need a hand getting things moved around, I'll be happy to help. Just look for a Nordic type about 5'11" snapping pictures with a digital camera. I'll be carrying a yellow
Drake FRS radio, also.

Any one else going to Grays Lake?

73 'n cheers 'n beers,
George
****
George Sieverson (Amateur Radio - K9GDT)
E-mail: k9gdt@starnetusa.net (web updated 9/19/99)
Web Page: http://pwp.starnetinc.com/k9gdt/index.htm
(Radio Page - Humor, BA's & Homebrew only)
****
Bob Reynolds wrote:

> Chicago area BAers
> EXPO is this weekend. Would be nice to meet some of the gang for an eye-ball. Might even want to borrow some muscle there. I'll be the red-headed guy

with the back-brace.
>
> 73, Red K5VOL

Message-ID: <006301bf0572$c1b8fd40$1260e7d0@SandyBlaize>
From: "Sandy W5TVW" <ebjr@i-55.com>
To: Old Tube Radios <boatanchors@theporch.com>
Subject: RE: "Wobbler virus....
Date: Wed, 22 Sep 1999 22:20:13 -0500
MIME-Version: 1.0
Content-Type: text/plain;
     charset="iso-8859-1"
Content-Transfer-Encoding: 7bit

OK gang, enough already. I get the message!
Was just trying to be helpful. From this moment forward, no
more
"warnings" about any virus will I forward to anyone...EVER!
I don't "surf" the net much, so I'm not privvy to the
huckster bunch
that seems to delight in stirring the S--T pile just for "kicks".
Sorry, sorry, sorry, sorry.
I'll stick to radio only.

73,
Sandy

Message-Id: <199909230402.VAA08696@mail-gw5.pacbell.net>
From: "Arden Allen" <gumbear@pacbell.net>
To: Old Tube Radios <boatanchors@theporch.com>
Subject: Re: BIG IRON, transformers and chokes and rectifiers
Date: Wed, 22 Sep 1999 20:55:30 -0700
MIME-Version: 1.0
Content-Type: text/plain; charset=ISO-8859-1
Content-Transfer-Encoding: 7bit

Hi again Barry;

> I fully agree with all of this except the last sentence. With
> vacuum rectifiers, the internal plate resistance of the tube is
> inversely proportional to the cube root of the tube current.
> Thus there can be no single resistor value that can be added in
> series with a silicon diode that will behave identically to the
> way the tube behaves over a wide current range. However, once
> the desired average current is known, it is possible to calculate
> the resistor value fairly accurately. The method is based on a

> non-linear analysis, and while first published 56 years ago, it
> is still in common use. Simplified versions of this method have
> been published in many places including the ARRL Handbooks, but
> these leave out one important graph needed for vacuum tube
> rectifiers. The original article is best consulted as it has
> experimental data for 34 popular vacuum rectifier tubes (like
> 5U4, 5R4, 5Y3, 80, 6X4, etc.). While the calculations are not
> trivial, they can be done quickly - probably faster than Arden
> can solder in a few resistors. For those than can get the
> original 20 page article, I suggest they do so as the analysis
> given is an excellent introduction to power supply design. See:
>
> Schade, O. H.: "Analysis of Rectifier Operation",
> Proc.I.R.E., Vol. 31, pp. 341-361, July, 1943.

Now that you put your calculator on the table I'll see you my Clarostat
load resistor box ($15 at the swap would you believe!).

Seriously, if you are familiar with the material Barry sites, of course a calculation will give you a quick answer. But stray from just replacing the rectifier tube, like changing filters or their values, or adding chokes, then it gets hairy. If you don't have a collection of power resistors or a load box and you haven't been through the power supply design process before you have a chore ahead of you. Going the study route is the right approach if you are grounded in engineering discipline. If you are a tinkerer (like I am in most cases) you will learn some practical lessons from experimenting. Plenty of both is best IMO.

BTW, what's chances of getting the IRE article PDF'ed?

Arden Allen KB6NAX Vallejo, CA gumbear@pacbell.net

Message-Id: <199909230402.VAA08716@mail-gw5.pacbell.net>
From: "Arden Allen" <gumbear@pacbell.net>
To: Old Tube Radios <boatanchors@theporch.com>
Subject: Re: GB> Coil Winding Machine--date
Date: Wed, 22 Sep 1999 21:01:46 -0700
MIME-Version: 1.0
Content-Type: text/plain; charset=ISO-8859-1
Content-Transfer-Encoding: 7bit

Hi again Sandy;

> I've wound an awful lot of coils thru the years
> and they don't always behave like the math geniuses say they
> will!
> Edwin Armstrong proved this over and over.....that the "experts"

> weren't always right! "It's what we know, that ain't always so"
> was his
> byword. I've seen things that flew right in the face of theorists
> and
> stuff MSEE and PhDEE didn't have answers for.
>
> Just the wire isn't the only factor that comes into play. If it
> is then all the "Q" meters I've used are lying to me. Form
> factor
> (length vs. diameter, core size, insulation, how the wire is
> wound will have a lot to do with what you come out with in the
> end.
>
> I'm not jumping on you Arden, it's just what I've observed over
> many years. I have also seen EE's that were whizzes at theory
> but couldn't build a decent crystal set. Some didn't know which
> end of the soldering iron gets hot!
>
> 73,
> Sandy

Well I was jumping on you. I regret the impoliteness.

Barry commented, "But since ALL real wire insulation has dielectric loss, distributed capacity
decreases a coil's Q." I had previously stated, " At higher frequencies the power loss would be due primarily to skin effect resistance but also coil form or wire insulation dielectric loss." The only difference I see is I didn't mention the effect of insulation dielectric constant's affect on distributed capacity which is indirectly related to dielectric loss which is the heat loss factor. I didn't mention it because I don't think it is relevent to the discussion. Besides, a properly made choke won't suffer much from wire insulation dielectric loss. I will add to the discussion four succinct statements I believe are germaine:

1. If you get the Q low enough the choke will be useless for its intended purpose. Take your choice, too much resistance (or a mud pack for insulation) or not enough reactance.

2. Even a "low Q" plate choke can't take the punishment a power amp can meat out at the choke self resonance frequency.

3. Types of winding construction have virtually nothing to do with picking self resonance frequencies. The National R-175A (145uH) is made of multiple solenoidal wound sections and is good from 80 through 6 meters. The graduated size honeycomb wound R-152 (4000uH) is good for only 80 and 40. Johnson claimed their 102-754 (1900uH) with larger honeycomb coils at the ends is good for 160 to 10.

4. Just avoiding resonances at operating frequencies and their harmonics is not enough. An amp can be unstable and difficult to neutralize if care is not taken with plate chokes. I'm missing plenty of hair over that kind of problem.

Arden Allen   KB6NAX   Vallejo, CA   gumbear@pacbell.net

From: JPevner@aol.com
Message-ID: <ab0e00b9.251b0311@aol.com>
Date: Thu, 23 Sep 1999 00:14:09 EDT
Subject: HRO-500 help needed
To: Old Tube Radios <boatanchors@theporch.com>
MIME-Version: 1.0
Content-Type: text/plain; charset="us-ascii"
Content-Transfer-Encoding: 7bit

Hopefully someone out there can enlighten me on an odd problem I am having bringing an HRO-500 back to life??

Any signal I put in via a sig gen connected to the ant connector seems to generate a
series of images of decreasing strength both above and below the desired output at intervals of approx 10 khz. Further than abt 40khz, they disappear into the noise. I think I have isolated this to be some kind of artifact of the spectrum generator. I can get rid of these images by disabling the HFO and substituting another sig gen at the first conversion mixer.

Things seem to be vaguely normal in the spectrum generator, re the o'scope pictures in the manual, and the synth does lock at the appropriate points.

So far, I have:
1) replaced all electrolytics
2) cleaned all contacts with de-oxit
3) replaced 500khz crystal which wouldn't start
4) gotten very aggravated with this rig

please either reply via personal e-mail, or to the list you think it of more general interest.

thanks in advance,
de N1LIS/Jon

Message-ID: <37E9AC82.2010@revealed.net>
Date: Wed, 22 Sep 1999 23:28:50 -0500
From: Mike Souhrada <wb9iog@revealed.net>

MIME-Version: 1.0
To: Old Tube Radios <boatanchors@theporch.com>
CC: Old Tube Radios <boatanchors@theporch.com>
Subject: Re: BAers at EXPO
Content-Type: text/plain; charset=us-ascii
Content-Transfer-Encoding: 7bit

George /Red
Think I need to make or buy a BA hat!

I was thinking of going- been there every year for about 15 yrs.
I usually camp near the big oak tree kitty-corner from the main exhibit hall
(If I get there in time.)
However this year its tenting time-my camper is pretty shot.
Not much in BA to bring-a SB102 about it.
Where are the bleachers? Don't seem to recall-those.
(Is that along the fence line?)
Anyone interested in a very complete Drake 7 line-belongs to a friend.
Can bring if any serious lookers. It's heavy & not BA.

BTW really should go after the disasterous Peoria HF last week end.
I think that will be my last! After 20+ years a great HF bites the dirt.
Only thing I saw at Peoria was a pretty nice looking (after the buyer
cleaned it up) Valiant; buyer wanted $280 after mark down but not sure
if it sold for that.

Mike
Le Claire, Iowa

>
> Greetings Red and Thermionic Emissives,
>
> I'll be there both days with my hamfest buddy, K9KLT.   While there, be sure to check out "Boatanchor Row" just south of the bleacher area.
>

Message-Id: <199909230400.AAA01552@flash.naxs.net>
From: "Barry L. Ornitz" <ornitz@tricon.net>
To: Old Tube Radios <boatanchors@theporch.com>
Subject: Re: BIG IRON, transformers and chokes and rectifiers
Date: Thu, 23 Sep 1999 00:55:14 -0400

Arden wrote:

>Seriously, if you are familiar with the material Barry sites, of
>course a calculation will give you a quick answer. But stray

>from just replacing the rectifier tube, like changing filters or
>their values, or adding chokes, then it gets hairy.

Actually, the procedure is quite simple. It took me about two to three minutes to calculate the values for Ben Hall's RME power supply recently. It took _MUCH_ longer than that to write everything down for Ben to follow. The procedure takes into account the capacitor values of a capacitor-input filter. Adding chokes only takes another minute or so.

>If you don't have a collection of power resistors or a load box
>and you haven't been through the power supply design process
>before you have a chore ahead of you.

Not really, but it helps to have read and understood the article before starting. This DOES take a while. Once learned, the procedure goes very quickly.

>Going the study route is the right approach if you are grounded
>in engineering discipline. If you are a tinkerer (like I am in
>most cases) you will learn some practical lessons from
>experimenting. Plenty of both is best IMO.

I don't deny tinkering is valuable, but the method hardly requires an engineering degree. Going through an analysis to derive the curves might require some higher education, but using the curves is really simple.

>BTW, what's chances of getting the IRE article PDF'ed?

It is 20 large pages in small print with LOTS of large graphs and illustrations. Thus a PDF would be quite large. Based on tube data sheets in PDF, many pages would be several megabytes each. You also have to worry about the copyright issue. The IRE Proceedings are generally found in any university library with an engineering program. Most public libraries can order a copy too.

The main graphs have been published in many other places. The only one that is not common is the one showing plate resistances of vacuum rectifier tubes. The data on this is straightforward enough to give an equation with different constants for each tube type. I would be glad to generate these for a few of the more common tubes.

73, Barry   WA4VZQ   ornitz@tricon.net

Message-Id: <199909230524.BAA08788@flash.naxs.net>
From: "Barry L. Ornitz" <ornitz@tricon.net>
To: Old Tube Radios <boatanchors@theporch.com>
Subject: Re: GB> Coil Winding Machine
Date: Thu, 23 Sep 1999 02:19:12 -0400

Sandy Blaise, W5TVW, wrote:

>> "Q will depend on the "form factor" of the windings,
>> wire size used, distributed capacity, number of 'pies' etc.,

This is entirely correct, but I am not sure Arden Allen fully grasps this yet.

For the same inductance, varying any of these will change the Q. In fact, for the same wire size AND inductance, it is possible to change the Q by just altering the geometry of the coil. Why do you think HF mobile antenna experimenters are still changing coil shapes in an effort to raise Q?

You wrote in circles here. [But it is getting late.]

>The only difference I see is I didn't mention the effect of
>insulation dielectric constant's affect on distributed capacity
>which is indirectly related to dielectric loss which is the heat
>loss factor.

Heat generated in the coil comes from dielectric loss, permeability loss (in coils having a magnetic core), and skin effect (which is related to the resistivity of the wire, the permeability of the wire, and frequency). The coil can also radiate, which lowers the coil Q without producing heat. This may sound counter-intuitive but a choke should ideally be a pure reactance. Any radiation consumes real energy so in this case it is a loss.

>Besides, a properly made choke won't suffer much from wire
>insulation dielectric loss.

Then why aren't conventional RF chokes used much above 6 meters?

>Types of winding construction have virtually nothing to do with
>picking self resonance frequencies.

Huh? The chokes you list all have quite different inductances so using them as examples means nothing. The winding construction has EVERYTHING to do with where the choke is resonant. A single multilayer solenoid will have lots of distributed capacity making it resonate at a lower frequency than the same inductance made by connecting several smaller windings in series. In addition to Pie windings, RF chokes that require lots of inductance, like LF coils, use a staggered winding technique that keeps the wires crossing each other at an angle to reduce distributed capacitance.

Finally...

>Just avoiding resonances at operating frequencies and their
>harmonics is not enough. An amp can be unstable and difficult
>to neutralize if care is not taken with plate chokes.

This is quite true. But also remember that parasitic suppressors, on the other hand, should be low-Q. Their purpose is specifically to absorb VHF energy and convert it to heat while having low loss at the fundamental frequency. High-Q coils here often create more problems than having none.

Coil geometry and it affect on inductance and Q is discussed extensively in Grover's "Inductance Calculations". This is an extremely useful, but moderately rare book. It has been published by at least three companies, but no one today knows who owns the copyright and none will reprint it for fear of the real owner showing up!

73, Barry L. Ornitz WA4VZQ ornitz@tricon.net

End of BOATANCHORS Digest 2676
****

```
>From ???@??? Thu Sep 23 22:02:59 1999
Message-Id: <199909240028.d8O0St115828@sco.theporch.com>
Date: Thu, 23 Sep 1999 19:28:30 CDT
From: Old Tube Radios <boatanchors@theporch.com>
To: Old Tube Radios <boatanchors@theporch.com>
Subject: BOATANCHORS digest 2677
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BOATANCHORS Digest 2677

Topics covered in this issue include:

1) Re: GB> Coil Winding Machine.......food fight
by Arden Allen <gumbear@pacbell.net>
2) Re: GB> Coil Winding Machine.......food fight
by "Barry L. Ornitz" <ornitz@tricon.net>
3) Yeasu cw filter for Drake
by BEN NOCK <G4BXD@compuserve.com>
4) Chokes/the Great Debate
by "Roberta J. Barmore" <rbarmore@indy.net>
5) Re: HRO-500 help needed
by Mike Sullivan <michaels@kc2kj.k2nesoft.com>
6) Re: BIG IRON... rectifier plate resistances
by polepeeg@aa4rm.ba-watch.org (Marty's Refl. Drop)
7) RE: Chokes/the Great Debate
by Wayne Harrah <wayne.harrah@wcom.com>
8) Re: GB> Coil Winding Machine.......food fight
by "Arden Allen" <gumbear@pacbell.net>
9) Re: Chokes/the Great Debate
by "Arden Allen" <gumbear@pacbell.net>
10) Re(2): HQ-170 dial question
by Al Parker <anchor@coastalnet.com>
11) Re: Re(2): HQ-170 dial question
by Kim Herron <kherron@voyager.net>
12) boatanchor keying
by Rodger Singley <rbsingl@ilstu.edu>
13) Re: boatanchor keying
by Charles Kadesch <chas@digizen.net>
14) Re: boatanchor keying
by "Arden Allen" <gumbear@pacbell.net>

Date: Thu, 23 Sep 1999 00:09:30 -0700
From: Arden Allen <gumbear@pacbell.net>
Subject: Re: GB> Coil Winding Machine.......food fight
To: Old Tube Radios <boatanchors@theporch.com>
Message-id: <0FII00LT13X8SA@mta4.snfc21.pbi.net>
MIME-version: 1.0
Content-type: text/plain; charset=ISO-8859-1
Content-transfer-encoding: 7bit

Arden Allen   KB6NAX   Vallejo, CA   gumbear@pacbell.net

> Sandy Blaise, W5TVW, wrote:
>
> >> "Q will depend on the "form factor" of the windings,
> >> wire size used, distributed capacity, number of 'pies' etc.,
>
> This is entirely correct, but I am not sure Arden Allen fully
> grasps this yet.

Says you.

> For the same inductance, varying any of these will change the Q.
> In fact, for the same wire size AND inductance, it is possible to
> change the Q by just altering the geometry of the coil. Why do
> you think HF mobile antenna experimenters are still changing coil
> shapes in an effort to raise Q?

The POINT that I am making and you are skirting is that Sandy's assertion
that low Q was necessary for successful plate choke operation is bogus.

> You wrote in circles here. [But it is getting late.]
>
> >The only difference I see is I didn't mention the effect of
> >insulation dielectric constant's affect on distributed capacity
> >which is indirectly related to dielectric loss which is the heat
> >loss factor.

I fell into the trap of trying to show that I understood what you were
saying and that it wasn't important to my case (as mentioned above).

> Heat generated in the coil comes from dielectric loss,
> permeability loss (in coils having a magnetic core), and skin
> effect (which is related to the resistivity of the wire, the
> permeability of the wire, and frequency). The coil can also
> radiate, which lowers the coil Q without producing heat. This
> may sound counter-intuitive but a choke should ideally be a pure
> reactance. Any radiation consumes real energy so in this case it
> is a loss.

All true but still of no concern to my case.

> >Besides, a properly made choke won't suffer much from wire
> >insulation dielectric loss.

> Then why aren't conventional RF chokes used much above 6 meters?

A non sequitur. Inductance by any other name......... Would you put
shellac on a three turn hunk of bus wire?

> >Types of winding construction have virtually nothing to do with
> >picking self resonance frequencies.

> Huh? The chokes you list all have quite different inductances
> so using them as examples means nothing. The winding
> construction has EVERYTHING to do with where the choke is
> resonant. A single multilayer solenoid will have lots of

> distributed capacity making it resonate at a lower frequency than the same inductance made by connecting several smaller windings in series. In addition to Pie windings, RF chokes that require lots of inductance, like LF coils, use a staggered winding technique that keeps the wires crossing each other at an angle to reduce distributed capacitance.

Yes Barry, it is late. You apparently missed the operative "picking".

> >Just avoiding resonances at operating frequencies and their harmonics is not enough. An amp can be unstable and difficult to neutralize if care is not taken with plate chokes.
>
> This is quite true. But also remember that parasitic suppressors, on the other hand, should be low-Q. Their purpose is specifically to absorb VHF energy and convert it to heat while having low loss at the fundamental frequency. High-Q coils here often create more problems than having none.

So? Who's talking about parasite munchers?

> Coil geometry and it affect on inductance and Q is discussed extensively in Grover's "Inductance Calculations". This is an extremely useful, but moderately rare book. It has been published by at least three companies, but no one today knows who owns the copyright and none will reprint it for fear of the real owner showing up!

I wish I had your library and was retired so I could have time to read it.

To recapitulate: Low Q is not an important criteria for a successful plate choke design (neither is high Q). Careful selection of self resonance frequencies in a series arrangement of capacitively isolated inductance sections IS important. These frequencies must be carefully selected not only with respect to the power amplifier's frequencies of operation and their harmonics but also to meet the stability criteria for the amplifier (avoiding similar resonances in amplifier input circuits). Winding method is of little importance as long as the preceeding requirements are met (winding method may aid in achieving conformance with respect to compactness of construction on one hand or high voltage withstand capability on the other hand, as examples). Good night.

Arden Allen   KB6NAX   Vallejo, CA   gumbear@pacbell.net

Message-Id: <199909230740.DAA17702@flash.naxs.net>
From: "Barry L. Ornitz" <ornitz@tricon.net>
To: Old Tube Radios <boatanchors@theporch.com>

Subject: Re: GB> Coil Winding Machine.......food fight
Date: Thu, 23 Sep 1999 04:35:03 -0400

Arden, you missed my first post when I said:

>Sandy Blaise, W5TVW, wrote:
>>> "Q will depend on the "form factor" of the windings,
>>> wire size used, distributed capacity, number of 'pies' etc.,

>And Arden Allen, KB4NAX, replied:
>>WRONG. Better get out that yellowed old theory book. Q is not
>>a function of magic, it is a function of electrical energy
>>converted into heat energy. Burn some lamp oil.

>Well, that goes for you too Arden. While Sandy was incorrect
>about the need for high-Q in an RF choke, his statement above is
>quite correct. Coil Q is certainly not a function of magic, but
>every item mentioned above affects coil Q with the theoretical
>exception of distributed capacity. But since ALL real wire
>insulation has dielectric loss, distributed capacity decreases a
>coil's Q.

Actually Sandy said low-Q and I made a typo, but my statement was only concerned with your saying form factor, wire size, distributed capacity, number of "pies" do not affect Q. Note that I plainly said that Sandy was incorrect in his original assertion.

Do you still believe these things do not affect coil Q?

>The POINT that I am making and you are skirting is that Sandy's
>assertion that low Q was necessary for successful plate choke
>operation is bogus.

I never skirted this at all. I said very plainly that Sandy's original assertion was incorrect. I was only pointing out the fact that the variables Sandy mentioned are decidedly the most important ones in determining coil Q, which you claimed was wrong, and told Sandy to get out the textbook.

>I fell into the trap of trying to show that I understood what
>you were saying and that it wasn't important to my case (as
>mentioned above).

But you were arguing on a point different from what I specifically said.

>All true but still of no concern to my case.

Oh, but if you look at the statement above which Sandy wrote and you clearly said it was wrong, this is certainly of concern. My issue was solely with the factors that affct coil Q.

>Yes Barry, it is late. You apparently missed the operative
>"picking".

It is not a particularly precise word in this discussion. I still cannot understand how you can say something that determines the resonant frequency does not "pick" the resonant frequency.

>So? Who's talking about parasite munchers?

I added this because many problems associated with RF choke failure are actually caused by VHF oscillation which should have been stopped by the parasitic suppressors. It comes down to simple loop stability. By "rolling off" the response at VHF, the RF choke does not have to do nearly as good a job at avoiding resonances at higher frequencies (proper pole placement).

>To recapitulate: Low Q is not an important criteria for a
>successful plate choke design (neither is high Q).

I agree, and I never said it was.

>Careful selection of self resonance frequencies in a series
>arrangement of capacitively isolated inductance sections IS
>important. These frequencies must be carefully selected not
>only with respect to the power amplifier's frequencies of
>operation and their harmonics but also to meet the stability
>criteria for the amplifier (avoiding similar resonances in
>amplifier input circuits).

Instead of "selecting" the resonances, the normal procedure is to just insure they do not cause problems in normal operation. Designing to produce specific resonances is hardly necessary. The issue is loop stability which is far more complicated than just watching at the fundamental and harmonics and for input circuit resonances. And speaking of word choices, I assume you meant capacitively COUPLED inductance sections when you talk about a single RF choke. The use of several individual coils, with bypass capacitors to ground between each coil, instead of one larger, multi-winding RF choke is far easier to analyze and design properly. That single RF choke is there only to save money in manufacturing.

>Winding method is of little importance as long as the preceeding
>requirements are met (winding method may aid in achieving
>conformance with respect to compactness of construction on one
>hand or high voltage withstand capability on the other hand, as
>examples). Good night.

With a single RF choke, winding technique is about the ONLY method of achieving the requirements. For the same overall inductance, how else can you modify the various self-resonant frequencies?

73, Barry   WA4VZQ   ornitz@tricon.net

Date: Thu, 23 Sep 1999 05:10:12 -0400
From: BEN NOCK <G4BXD@compuserve.com>
Subject: Yeasu cw filter for Drake
To: Old Tube Radios <boatanchors@theporch.com>
Message-ID: <199909230510_MC2-85F1-DAF5@compuserve.com>
MIME-Version: 1.0
Content-Transfer-Encoding: quoted-printable
Content-Type: text/plain;
      charset=ISO-8859-1
Content-Disposition: inline

I have a cw filter, XF-30C, for the FT-101 range,

would like a cw filter for a Drake R-4C

cheers, Ben G4BXD.

Date: Thu, 23 Sep 1999 06:53:25 -0500 (EST)
From: "Roberta J. Barmore" <rbarmore@indy.net>
To: Old Tube Radios <boatanchors@theporch.com>
Subject: Chokes/the Great Debate
Message-ID: <Pine.SUN.4.10.9909230611020.24035-100000@indy3>
MIME-Version: 1.0
Content-Type: TEXT/PLAIN; charset=US-ASCII

Hi!

I have read just a few of the messages in the "chokes" (coil winding machine) discussion, and it seems to me that we are missng the point.

When you want, oh, let's say "a plate choke for an RF amplifier," you're asking for a thing to do a job; but what's the *job?* That's the *real* question, the one that tells us what the thing is.

And what the "job" is here is that you need a device that offers low DC resistance but that at some alternating frequency becomes a very high impedance. (And "what's the frequency?" [Kenneth?] is the next question). That's all you want. In a perfect world, what we need here is 0 Ohms at DC and infinite Ohms from, oh, 1 cps through visible light and preferably in a small, indestrucable package.

They don't make that! You can't get it; Ed's 24-Hr Drive-Thru Radio Parts hasn't got any.

So, much like my long-suffering dentist, you make the very best compromise you can between a vastly imperfect reality and the unattainable ideal, which is (from low VHF down to our handy 1 cps) usually in the form of a lot of wire coiled up so it looks even longer to AC.

The next level of approximation would kind of like that coiled-up wire to exhibit no self-resonance effects, just be a large inductance smoothly increasing in impedance as a function of frequency like it sez in the handbooks (XsubL = 2*PI*F*L).

You can't even have *that,* Ed's is still fresh out, etc. So from here, our choices get *interesting.* We can dodge our imperfections or we can drown 'em but mostly we hedge our bets and try to do both! (But you don't have to--this is where you get to wear the "clever designer" hat and figure out what is workable and pleasing in your pet device).

You *dodge* 'em by picking or designing the chokage in such wise that in the application, it exhibits no self-resonances at or near any frequency we will ever run through the amplifier in question. (This is the "organ pipes make no sound if you don't blow air through them" thing: self-resonances won't bite you if you don't excite them).

You *drown* 'em by making such self-resonance broad and not very ringy; these are attributes of a low-Q resonant circuit and what you're doing is ensuring that, even at resonance, the "sneak tank" will take too much energy to get a satisifying ring; it acts like it has a lot of series R and stays a bit high-impedancy, which is ugly but works. (This is the "organ pipes are not very loud if you make them out of Jell-o" method).

How do we get from this level of real-world Dreadful Compromise to, say, a National R-100 pie-wound RFC, with four little universal-wound pies, a nominal 2.5 mH inductance and decent peformance across the HF range?

Simple. Universal windings are pretty durable and the stray C is minimized by having adjacent-layer wires cross at an angle; we use the smallest wire we can get away with 'cos the less surface area, the lower the stray C. We break up the winding into several sections so each section is a low-Q tuned circuit (broad and shallow resonance, won't ring up and give nifty volage/current peaks) and several of them in series give us *some* loss even at resonance. Plus the field tends to be pretty concentrated (so we can in the real world mount our real choke pretty close to other real components), and the little windings stay put nicely with just a dab of shellac.

Every choke you *ever* saw is some collection of these trade-offs, and like legal contracts or dental work, no two are quite the same: different needs and considerations and facilities lead to different ways of solving similar problems. It's like snowflakes, the underlying paradigm is the same but the final result exhibits vast variation.

Will high-Q chokes (as in, oh, solenoid wound, 1:1 form factor) work? Sure, if you pick 'em right! Will low-Q chokes work? Sure, if you pick 'em right. Goodness, a quarter-wave of wire in free space with the supply end grounded though a very large (at Fo) condenser will do the job splendidly at *one* frequency!

...But (and here's the Great Secret) there's no One Right Answer, and there's no formula from which to derive one. The closer you get to actual stuff you can actually pick up with your actual hands, the more the answer veers off into "it depends." Understanding *what* it depends on and *why* it depends on that is the whole trick to making this stuff work.

73,
--Bobbi

KB9GKX "RJ" rbarmore@indy.net Roberta J. (Bobbi) Barmore
FISTS #3388 * G-QRP #10001 * ARRL * RSGB * WIA
Appreciator Of Vacuum-Tube Ham Gear and Vintage Keys

Message-ID: <37EA1E8E.8B31FE85@kc2kj.k2nesoft.com>
Date: Thu, 23 Sep 1999 08:35:26 -0400
From: Mike Sullivan <michaels@kc2kj.k2nesoft.com>
MIME-Version: 1.0
To: Old Tube Radios <boatanchors@theporch.com>
CC: Old Tube Radios <boatanchors@theporch.com>
Subject: Re: HRO-500 help needed
Content-Type: text/plain; charset=us-ascii
Content-Transfer-Encoding: 7bit

What is the problem with the radio without the sig. gen. driving the antenna input?

JPevner@aol.com wrote:

> Hopefully someone out there can enlighten me on an odd problem I am having
> bringing an HRO-500 back to life??
>
> Any signal I put in via a sig gen connected to the ant connector seems to
> generate a
> series of images of decreasing strength both above and below the desired
> output at intervals of approx 10 khz. Further than abt 40khz, they disappear
> into the noise. I think I have isolated this to be some kind of artifact of
> the spectrum generator. I can get rid of these images by disabling the HFO
> and substituting another sig gen at the first conversion mixer.
>
> Things seem to be vaguely normal in the spectrum generator, re the o'scope
> pictures in the manual, and the synth does lock at the appropriate points.
>
> So far, I have:
> 1) replaced all electrolytics
> 2) cleaned all contacts with de-oxit
> 3) replaced 500khz crystal which wouldn't start
> 4) gotten very aggravated with this rig
>
> please either reply via personal e-mail, or to the list you think it of more
> general interest.
>
> thanks in advance,
> de N1LIS/Jon

Date: Thu, 23 Sep 1999 10:08:45 -0400
From: polepeeg@aa4rm.ba-watch.org (Marty's Refl. Drop)
Message-Id: <199909231408.KAA15144@aa4rm.ba-watch.org>
To: Old Tube Radios <boatanchors@theporch.com>
Cc: boatanchors@theporch.com
Subject: Re: BIG IRON... rectifier plate resistances

Of all things I was reading a lab-book from 7-42 on a class called 'pre-radar.'

Computing these values experimentally & plotting same on log-log paper was one exercise.

Diode used was WE PJ-7 which I've never seen referenced before. Pure tungsten fil.

Others were type 81 (oxide fil.) & diode-connected 10 (thoriated-tungsten fil.)

Whatta coincidence that it partially matches this thread!

Marty

Date: Thu, 23 Sep 1999 09:17:44 -0500
From: Wayne Harrah <wayne.harrah@wcom.com>
Subject: RE: Chokes/the Great Debate
To: Old Tube Radios <boatanchors@theporch.com>
Cc: boatanchors@theporch.com
Message-id: <002001bf05ce$67ed9ad0$296225a6@mcit.com>
MIME-version: 1.0
Content-type: text/plain; charset=iso-8859-1
Content-transfer-encoding: 8BIT

Bobbi,

I *LOVE* reading your stuff. And, usually I end up UNDERSTANDING IT after I'm done. But, I've likely laughed once or twice. And besides, every good DEBATE needs an umpire before the fisticuffs come out. Good show.

note: We should (as a group) make you promise to write something to us EVERY DAY.

Buzz

*   Buzz (Wayne) Harrah -   *
* (KEÿMS) mailto:Harrah@IA.NET (home)   *

[mailto:owner-boatanchors@theporch.com]On Behalf Of Roberta J. Barmore
Sent: Thursday, September 23, 1999 6:53 AM
To: Old Tube Radios
Subject: Chokes/the Great Debate

Hi!

I have read just a few of the messages in the "chokes" (coil winding machine) discussion, and it seems to me that we are missng the point.

>edited<

...But (and here's the Great Secret) there's no One Right Answer, and there's no formula from which to derive one. The closer you get to actual stuff you can actually pick up with your actual hands, the more the answer veers off into "it depends." Understanding *what* it depends on and *why* it depends on that is the whole trick to making this stuff work.

73,
--Bobbi

Message-Id: <199909231624.JAA02038@mail-gw.pacbell.net>
From: "Arden Allen" <gumbear@pacbell.net>
To: Old Tube Radios <boatanchors@theporch.com>
Subject: Re: GB> Coil Winding Machine.......food fight
Date: Thu, 23 Sep 1999 08:29:15 -0700
MIME-Version: 1.0
Content-Type: text/plain; charset=ISO-8859-1
Content-Transfer-Encoding: 7bit

Barry;

I said what I said, imprecise or incorrect, depending on how you understood the context of the debate but I think the issue is resolved for the list readers and I think we should not waste list resources by continuing in this vein.

Arden Allen KB6NAX Vallejo, CA gumbear@pacbell.net

Message-Id: <199909231625.JAA02090@mail-gw.pacbell.net>
From: "Arden Allen" <gumbear@pacbell.net>
To: Old Tube Radios <boatanchors@theporch.com>
Subject: Re: Chokes/the Great Debate
Date: Thu, 23 Sep 1999 09:23:18 -0700
MIME-Version: 1.0
Content-Type: text/plain; charset=ISO-8859-1
Content-Transfer-Encoding: 7bit

Hi Bobbi;

> You *drown* 'em by making such self-resonance broad and not very ringy;
> these are attributes of a low-Q resonant circuit and what you're doing is
> ensuring that, even at resonance, the "sneak tank" will take too much
> energy to get a satisifying ring; it acts like it has a lot of series R
> and stays a bit high-impedancy, which is ugly but works. (This is the
> "organ pipes are not very loud if you make them out of Jell-o" method).

The problem with this hypothesis is that in any practically realizable coil winding scheme the Q of the analogous Jello is only going to very from how stiff the Jello is in the refrig to how stiff it is after sitting on the dining table before dinner is served. Both will jiggle at their respective resonant frequncies.

When talking about self resonance of a plate choke, it may not be clear to some that we are talking about a resonance caused by the mutual inductance of a coil winding and its associated interwinding capacitance where at some frequency the inductive reactance is equal to the capacitive reactance and a series resonant circuit appears across the terminals of the inductor. Below the self resonant frequency (SRF) the coil appears inductive. Above the SRF the coil appears capacitive. At resonance a series resonant circuit has minimum impedance, the inductive reactance is cancelled by the capacitive reactance and what remains is the winding resistance of the coil in the simplist sense. If a series resonant circuit is placed from the plate of an RF amp to AC ground than you have a practical short circuit across the tube's output at the coil's SRF. If the amp's grid is driven at the coil's SRF then a heavy current will flow in the plate circuit and in the case of a class C power amplifier the tube will soon be damaged and the plate choke will also experince high DC plate current as well as a high circulating AC current and may burn up. At series resonance, a coil's Q is of little consequnce. Actually, the Q setting loss mechanisms of the coil are esponsible for the coil's destruction!

Arden Allen KB6NAX Vallejo, CA gumbear@pacbell.net

Message-Id: <3.0.5.32.19990923150925.008ddaa0@mail2.coastalnet.com>
Date: Thu, 23 Sep 1999 15:09:25 -0400
To: Old Tube Radios <boatanchors@theporch.com>
From: Al Parker <anchor@coastalnet.com>
Subject: Re(2): HQ-170 dial question
Mime-Version: 1.0
Content-Type: text/plain; charset="us-ascii"

At 09:01 AM 09/23/1999 +1000, Morris Odell wrote:
>Owens, Clarence wrote:
>> I recently bought a very nice looking HQ-170
>> Where should the washers be located?
>I'd like to know this too - I've got one "on the stack".
>While you're at it, what's differences are there, if any, between the
>HQ170 and the HQ170A??

Hi guys,

I said I'd take a look tomorrow & see if I can see what's needed.

Here's what I see on both the 170 & 180A -- the fiber washers are behind both plastic pieces, next to the nut. i.e. the last piece in the stack before installing the nut.

On the other question, I said the A has a 3-pos. switch for AM/CW/SSB, the non-A has 2-pos., AM/CW-SSB. Both can select upper, or lower, or both SB. But remembering conv. w/Bruce Mac., I think not all A's have the 3-pos. sw.
73,

Al, W8UT
New Bern, NC

Boat Anchors appreciated here
anchor@coastalnet.com

Message-Id: <3.0.6.32.19990923192114.007ffd40@pop.voyager.net>
Date: Thu, 23 Sep 1999 19:21:14 -0500
To: Old Tube Radios <boatanchors@theporch.com>
From: Kim Herron <kherron@voyager.net>
Subject: Re: Re(2): HQ-170 dial question
Mime-Version: 1.0
Content-Type: text/plain; charset="us-ascii"

Hi Guys,

I'm certainly not an authority on Hammarlund gear, but I've owned more than my share and refurbed a bunch.

Let me see if I can help on the dial question.

The escutcheon (casting that's mounted on the front panel) has four studs that hold flat fiber washers to keep the dials from rubbing on the dial fiducial (that's the clear plastic piece that has the black indicator line). Usually, there are two small fiber washers for spacing and a large washer to hold the dial at the right distance from the fiducial. On later radios (I don't know when the change was made), there is a larger diameter to the stud and only the large fiber washer is used. It's definitely this way on the A version radios.

The offset of the fiducial line on the HQ-170 and A is deliberate and is a mechanical compensation for capacitance differences between bands. It was designed that way and if you change it, you'll be forever trying to get the compensating tabs reset on the main tuning capacitors.

I think that I've mentioned this before (differences between the 170/180 and the a versions)but it's always fun to review.

The 170/180 had a 5U4GB (or variant) for the power supply. The A version went solid state on the power supply. The 170/180 used a 12 hour clock as an option. The 24 hour clock became the option when Hammarlund came out with the A version. I've seen the documentation on this. The 170/180 had no fixed offset for SSB (2 position switch). All A versions went to AM/SSB/CW on the mode switch. And last but probably the most important, was the change in the heater wiring. The 145/170/180 all went completely off when turned off. The A versions used a separate filament transformer to keep the HF OSC and the RF AMP hot all the time. This little trick made rock solid receivers out of 170's and 180's. My 170A VHF and 180A DO NOT DRIFT! Period! If you fellows who have 170's and 180's want to make a monumental improvement to your receivers, this is one of those service bulletins you want to do.

One more thing, that many are not aware of. There are actually THREE 180 versions of receiver. The original 180 had no vernier tuning and the slot depth control was on the front panel. The later 180 moved the slot depth control inside the receiver, the BFO control was moved to the slot depth control hole and vernier tuning was put where the BFO had been. The service bulletin from Hammarlund made available a kit to add this to an existing receiver, and you'll find a little gray metal tab with the proper silkscreening on it affixed to the from panel in place of the slot depth control. This is factory issue. Nobody butchered it.

Lastly, was the fliptop cabinet. It came out before the A version did, but not much before. I have seen factory original 170's and 180's with the fliptop cabinet. They got complaint that the slot depth control wasn't accesible, even though it's supposed to be a "set it and forget it" control.

Hope this helps and not create more confusion.

Kim

Message-Id: <199909232317.SAA28955@mail.ilstu.edu>
Date: Thu, 23 Sep 1999 18:17:33 -0500
To: Old Tube Radios <boatanchors@theporch.com>
From: Rodger Singley <rbsingl@ilstu.edu>
Subject: boatanchor keying
Mime-Version: 1.0
Content-Type: text/plain; charset="us-ascii"

Having replaced the shorted VN10KM keying fets in both my MFJ keyers I am curious what sorts of external keying systems BA users are employing. I have empirically found that the MFJ is not up to keying either Johnson Challengers or Harvey Wells TBS-50 rigs. Although it is advertised to work with tube rigs, the cathode keying output is not up to most BA rigs and attempting to use it results in shorted transistors. I am leaning towards a reed relay added to the keyer but I am interested in what others have been doing.

73,
Rodger WQ9E

Message-ID: <37EAE44F.5E78@digizen.net>
Date: Thu, 23 Sep 1999 19:39:11 -0700
From: Charles Kadesch <chas@digizen.net>
MIME-Version: 1.0
To: Old Tube Radios <boatanchors@theporch.com>
Subject: Re: boatanchor keying
Content-Type: text/plain; charset=us-ascii
Content-Transfer-Encoding: 7bit

I use a Mercury Wetted Relay (Clare HGSM5010) driven by a simple

transistor switch. These relays can follow a keyer at very high
speeds and I have never had the relay stick. You can also key
it with a bug or straight key and keep the BA current off the contacts.
-73-
Charles W3KC

Message-Id: <199909240028.RAA13330@mail-gw6.pacbell.net>
From: "Arden Allen" <gumbear@pacbell.net>
To: Old Tube Radios <boatanchors@theporch.com>
Subject: Re: boatanchor keying
Date: Thu, 23 Sep 1999 17:27:35 -0700
MIME-Version: 1.0
Content-Type: text/plain; charset=ISO-8859-1
Content-Transfer-Encoding: 7bit

Roger;

> Having replaced the shorted VN10KM keying fets in both my MFJ keyers I am
> curious what sorts of external keying systems BA users are employing. I
> have empirically found that the MFJ is not up to keying either Johnson
> Challengers or Harvey Wells TBS-50 rigs. Although it is advertised to
work
> with tube rigs, the cathode keying output is not up to most BA rigs and
> attempting to use it results in shorted transistors. I am leaning
towards
> a reed relay added to the keyer but I am interested in what others have
> been doing.

Perhaps a MOSFET with a higher drain voltage rating will take care of the
problem. The VN10KM is rated at 60 volts I believe. The common IRF740 is
good for 400 volts. Take a look in the Digi-Key catalog.

Arden Allen   KB6NAX   Vallejo, CA   gumbear@pacbell.net

End of BOATANCHORS Digest 2677
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